

Claims

1. A device for coating and/or surface modification of objects in a vacuum, by means of a plasma, which is characterized by the fact that a box structure (1) of an electrically conductive material forms a vacuum chamber or can  
5 be inserted into a vacuum chamber, into which objects (2) are inserted into the box structure (1) through at least one closable opening (8) at a distance from the inner wall, at least one opening (3) for supply and at least one opening (4) for removal of operating gas and an opening (6,6') for introduction of energy for generation of a glow discharge are present, and the box structure (1) has a potential that is  
10 electrically negative with respect to the plasma generated by the glow discharge.

2. A device as in Claim 1, which is characterized by the fact that an electrode (5), to which a DC or AC voltage is applied for plasma generation, is inserted into the box structure (1) through an opening (6').

15

3. A device as in Claim 1, which is characterized by the fact that microwaves for plasma generation are directed into the interior of the box structure through opening (6).

*CLAIM 1*

20

4. A device as in ~~one of Claims 1-3~~ *CLAIM 1* which is characterized by the fact that the objects (2) are arranged in electrically isolated fashion from the box structure (1).

*CLAIM 1*

25

5. A device as in ~~one of Claims 1-4~~ *CLAIM 1* which is characterized by the fact that the objects (2) are supplied with a settable electrical potential.

*CLAIM 1*

30

6. A device as in ~~one of Claims 1-5~~ *CLAIM 1* which is characterized by the fact that the inner wall of the box structure (1) or the box structure (1) is formed of a coating material or is arranged there as a flat target.

*CLAIM 1*  
A 7. A device as in ~~one of Claims 1-4~~ which is characterized by the fact that the box structure (1) is cooled.

*CLAIM 1*  
A 5 8. A device as in ~~one of Claims 1-7~~ which is characterized by the fact that the clear width of the box structure (1) is at least 1.2 times that of the objects (2) and the objects (2) fill the space available in the box structure (1) to a percentage of 0.1% to 30%.

*CLAIM 1*  
A 10 9. A device as in ~~one of Claims 1-8~~ which is characterized by the fact that the size of the withdrawal opening (5) is larger than the sum of the larger of the other openings (3,6,6') of the box structure (1).

*CLAIM 1*  
A 15 10. A device as in ~~one of Claims 1-9~~ which is characterized by the fact that the box structure (1) or its inner surface consists of a metal, a metal alloy or a metal compound.

*CLAIM 1*  
A 20 11. A method for coating and/or modification of the surfaces of objects with a device as in ~~one of Claims 1-10~~ which is characterized by the fact that after evacuation to a sufficiently low pressure and flushing with an operating gas a plasma is generated in the box structure (1), where the plasma power and the negative potential of the box structure (1) are set so that modification of the surface and/or, through material stripping from the inner wall of the box structure (1), coating of the surface of the object (2) is carried out.

25 12. A method as in Claim 11, which is characterized by the fact that before modification or coating an ion-supported desorption of deposited adsorbate layers is carried out with applied negative potential applied to the box structure (1) and glow discharge initiated.

*CLAIM 11*  
A 30 13. A method as in ~~Claim 11 or 12~~, which is characterized by the fact that reactive gas is supplied during the coating.

A 14. A method as in ~~one of Claims 11-13~~ <sup>CLAIM 11</sup> which is characterized by the fact that solid powder is introduced into the box structure and/or is made available in a container arranged there and the solid powder is deposited on the surface (2) of the objects.

H 15. A method as in ~~one of Claims 12-14~~ <sup>CLAIM 12</sup> which is characterized by the fact that the potential difference between the box structure (1) and the plasma is set in the range between 100-1000 V.

10 A 16. A method as in ~~one of Claims 12-14~~ <sup>CLAIM 12</sup> which is characterized by the fact that the operating gas is adjusted to a volume flow of 10-1000 cm<sup>3</sup>/min[STP].

A 17. A method as in ~~one of Claims 12-16~~ <sup>CLAIM 12</sup> which is characterized by the fact that for surface modification the potential difference between the plasma and the box structure (1) is adjusted to less than 200 V and/or the pressure is increased by at least threefold.

A 18. A method as in ~~one of Claims 12-17~~ <sup>CLAIM 12</sup> which is characterized by the fact that a hollow cathode flow discharge is formed in the box structure (1).

20 A 19. A method as in ~~one of Claims 11-18~~ <sup>CLAIM 12</sup> which is characterized by the fact that an inner gas, reactive gas or a mixture of inert and reactive gas is introduced in a timewise defined fashion as the working gas into the box structure (1).